Attachment A

Expert Report of the Court's Independent Medical Expert Dr. Warren Bagley

Report Based upon Dr. Bagley's Physical Examination of David Larry Nelson Conducted at Holman Prison on October 11, 2006

This examination took place in the infirmary area of Holman State Prison on Wednesday 11 October 2006 from 1420-1500 hrs. Present were the examiner (Warren Bagley, MD), Attorney Chris Heinss (Balch, Bingham Special Master), Prisoner's Attorney Victoria Smith, Attorney General's Representative Clay Crenshaw, Prison Warden Grantt Culliver, Prisoner's Expert Witness Mark Heath, MD, and two guards.

I examined Mr. Nelson with regards to obtaining venous access, visually and with palpation, and sonographically. The results of both exams are documented both in writing and with supporting photographs.

Mr. Nelson was asked to lie supine on a gurney. The first examination was visual and with palpation. A tourniquet was applied to the left upper arm, the arm was extended towards the floor from the gurney, and I knelt by the gurney to perform the exam. The reason for this somewhat awkward position is that gravity assists with helping the veins stand out; blood tends to pool in the lowest part of the body.

As can be seen from photos A and B, there are no prominent superficial veins on the forearm which would support an IV of sufficient size (see Glossary) to administer the volume of solution at the necessary rate to perform an anesthetic, administer fluids for resuscitation, etc. The examination included the palmar and volar (see Glossary) aspects of the hand, wrist, and forearm, and the antecubital fossa (see Glossary). The line on Photo B represents the level at which ultrasonic examination of the antecubital fossa occurred.

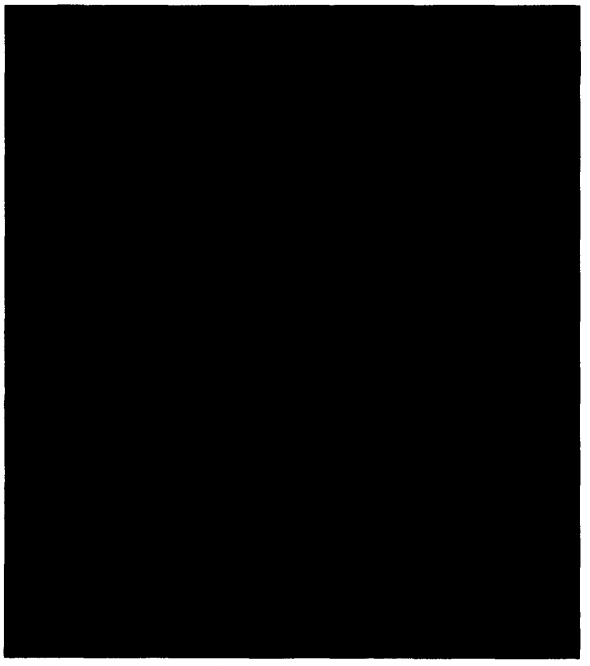


Photo A

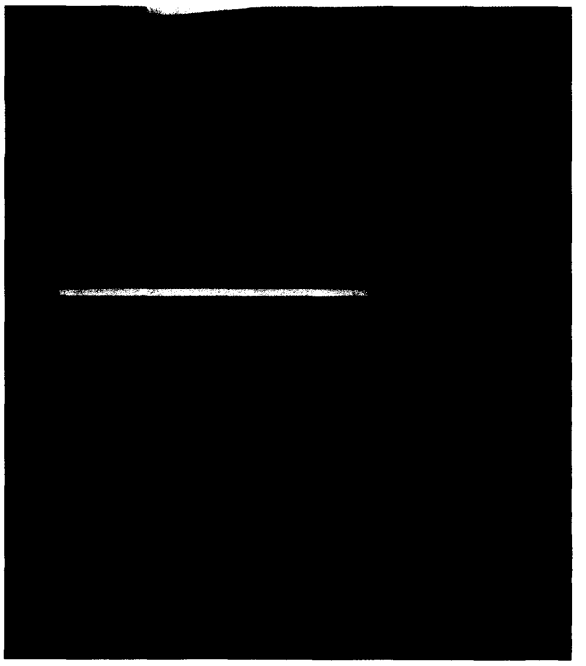


Photo B

The ultrasonic examination (see Glossary) of the left antecubital fossa did not reveal any veins. See Ultrasound 1.

Ultrasound 1.

Note: although the ultrasound exam was performed after the visual/palpatory exam, I present them simultaneously for the sake of clarity.

The second area of examination was the left lower extremity. A tourniquet was applied to the mid-calf and examination of the foot and ankle was carried out, again with the extremity dangling off the gurney and the examiner kneeling.

It should be noted that Mr. Nelson's skin on the lower extremities has hyperpigmented and pitting edema changes consistent with venous stasis (see Glossary) and congestive heart failure. He also has a history of congestive heart failure, and of upper thigh varicosities (see Glossary). Although it is technically possible to insert an IV into a varicosity, it is generally quite painful and not always successful, as varicosities are often tortuous.

The largest and most commonly cannulated (see Glossary) peripheral vein in the leg is the saphenous vein, which courses up the medial (inside) portion of the ankle and leg. While I was not able to see this vein on the left ankle, it was distinctly palpable and clearly visible on ultrasound. See Photos C and D, and Ultrasound 2. Again, yellow line indicates level of ultrasound exam. The white donut-shaped device is the tourniquet.

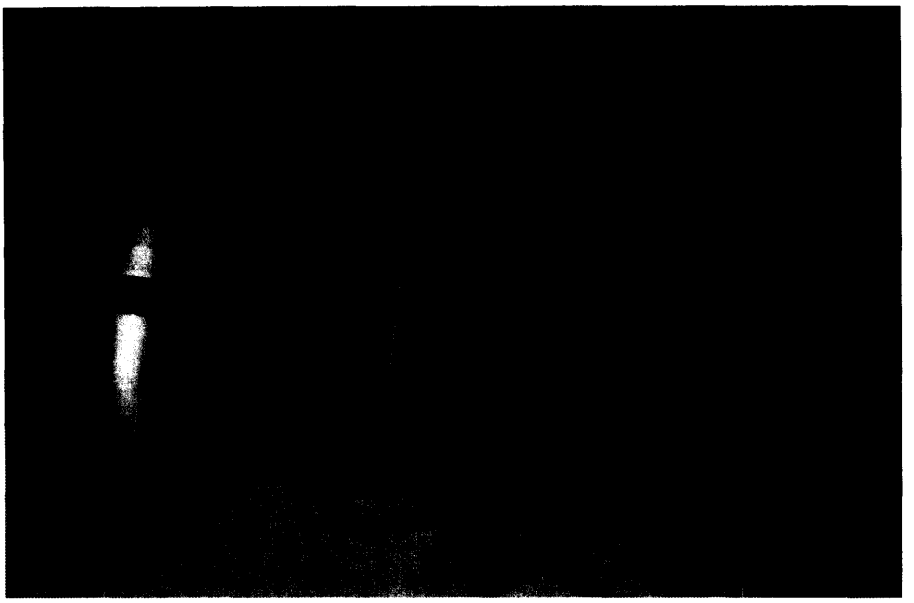


Photo C

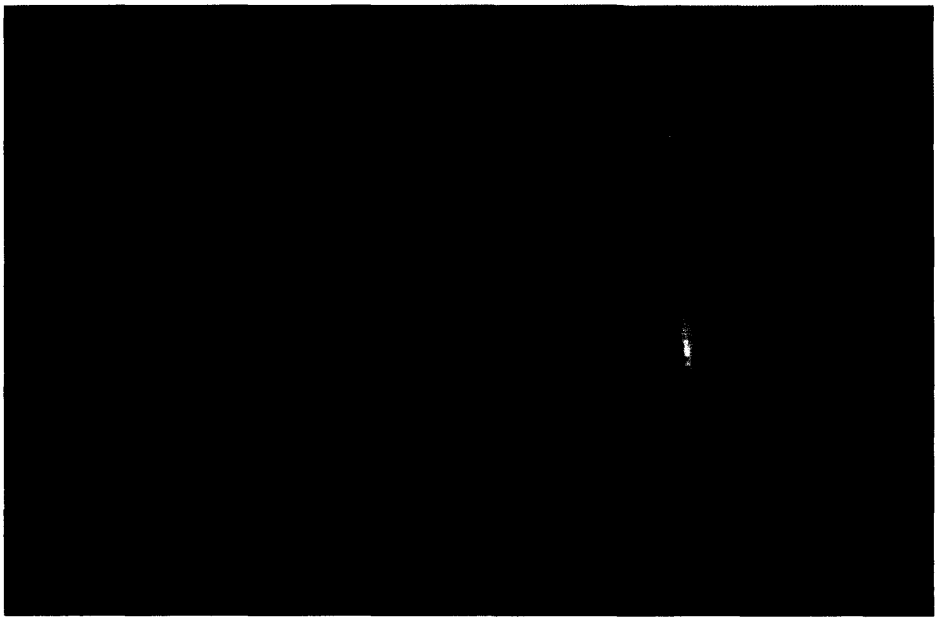
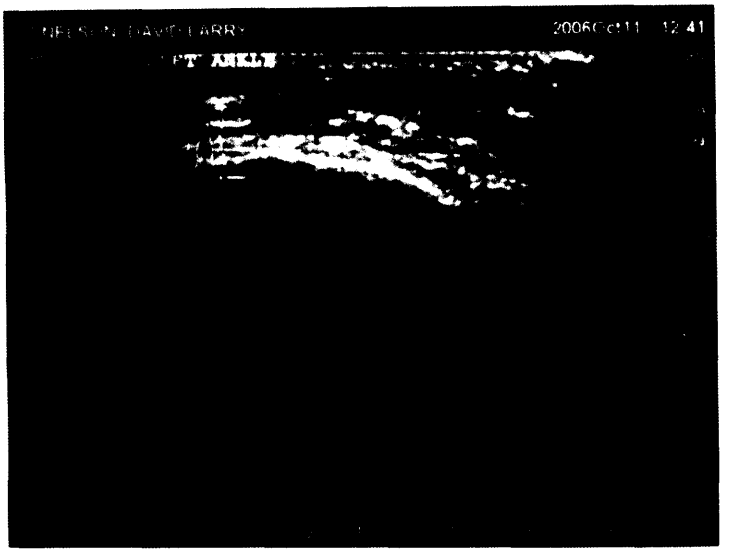


Photo D



Ultrasound 2

The saphenous vein is clearly visible in cross-section as the dark round structure at the end of the arrow. This vein is readily able to be cannulated by persons who are certified to initiate IV therapy, i.e. emergency medical technicians/paramedics who are so certified, military combat medics, nurses, CRNAs (certified registered nurse anesthetists), PAs (physician's assistants) and physicians.

The next area examined was the right ankle, which followed the same protocol as for the left. See Photos E and F, and Ultrasound 3. The saphenous vein in this leg was visible, palpable, and readily visualized on ultrasound.

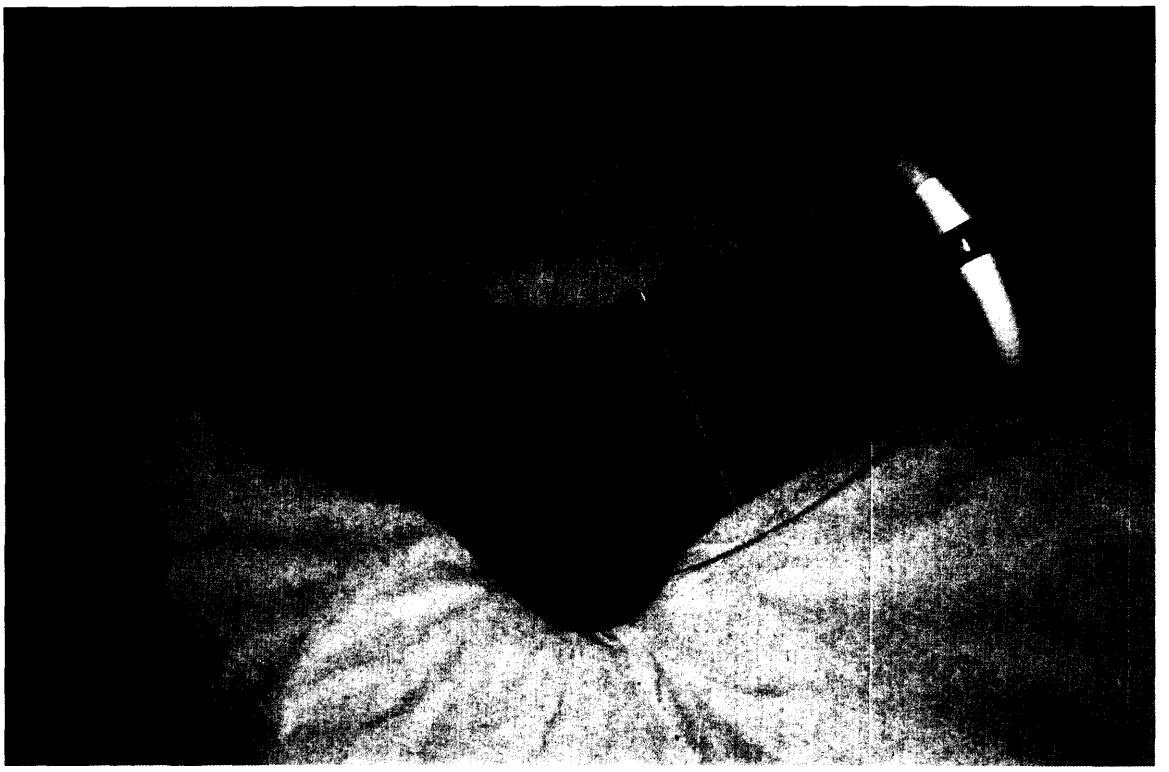


Photo E

The dark arrows point to the saphenous vein. The yellow line is the level at which ultrasound examination occurred.

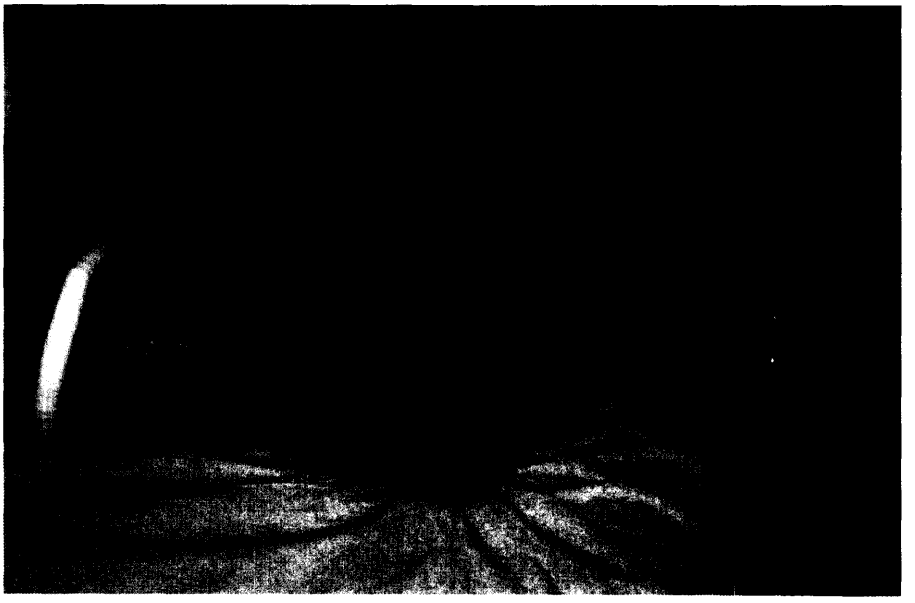
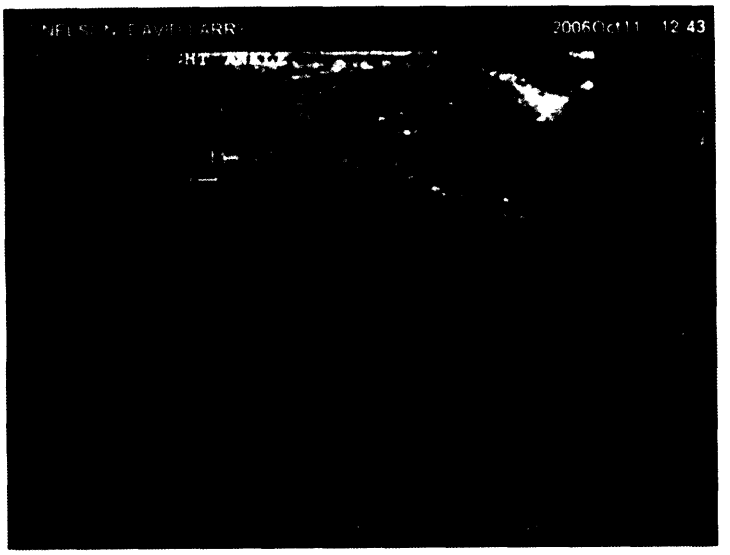


Photo F



Ultrasound 3

The dark arrow points to the lumen (see Glossary) of the saphenous vein. This vein is equally accessible as was the left, by the same level of personnel.

The next area examined was the right arm, performed in a manner similar to the left, with the tourniquet in place and the arm extended down towards the floor. The distal forearm and hand were again devoid of visible or palpable veins. The antecubital fossa contained a large vein (the basilic vein) which was visible, palpable, and readily visualized with ultrasound. See Photo G and Ultrasound 4.

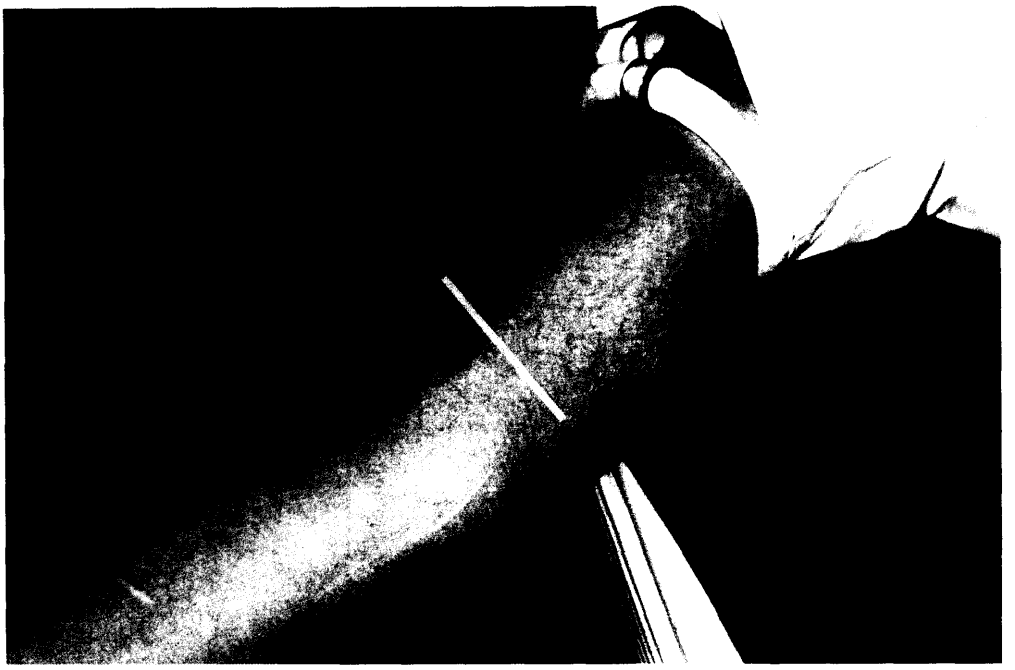
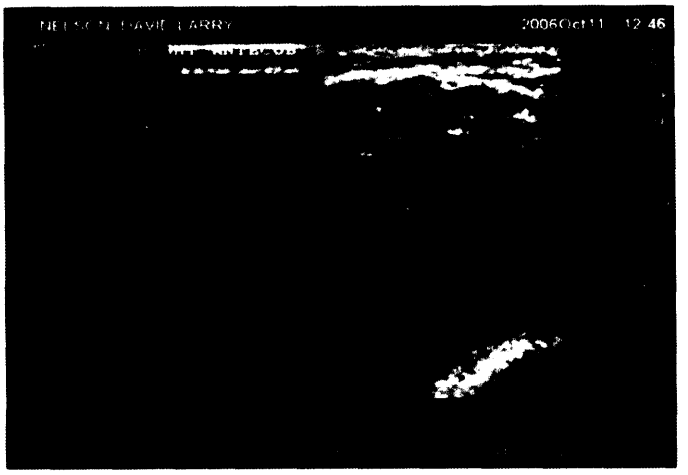


Photo G

The dark arrows point to the basilic vein.



Ultrasound 4

The dark arrow points to the basilic vein. This vein is readily cannulated by anyone trained/certified to start basic intravenous lines, even more easily than the saphenous veins listed above, and is one of the veins commonly used when blood is drawn for laboratory tests or for blood donation.

The next area examined was the right side of the neck, specifically the area known as the anterior cervical triangle (see Glossary). In this area lie the internal and external jugular veins. In the supine position Mr. Nelson's

external jugular vein was readily visible (see Photo H), and easily seen with ultrasound (see Ultrasound 5).

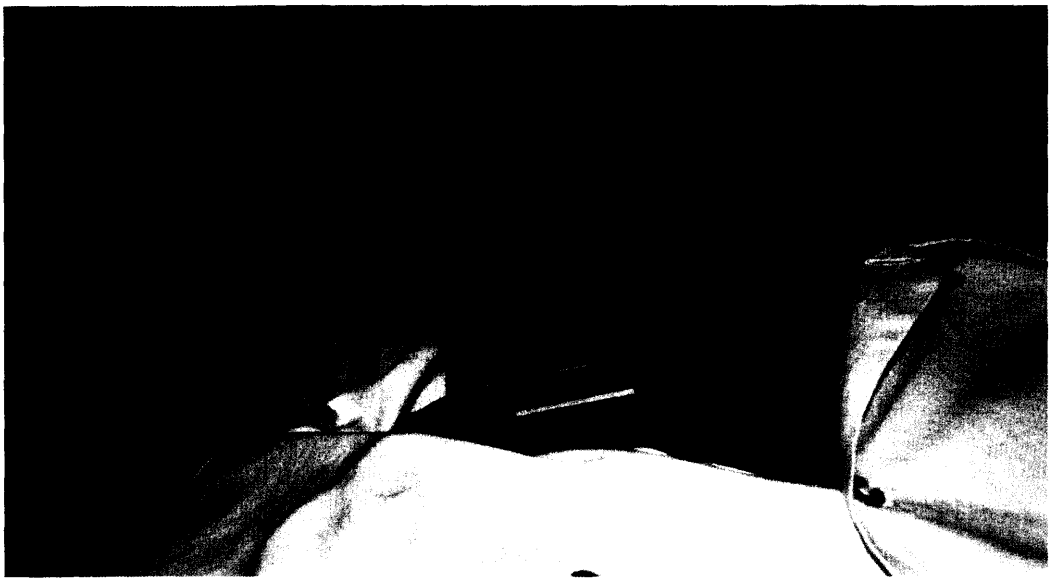
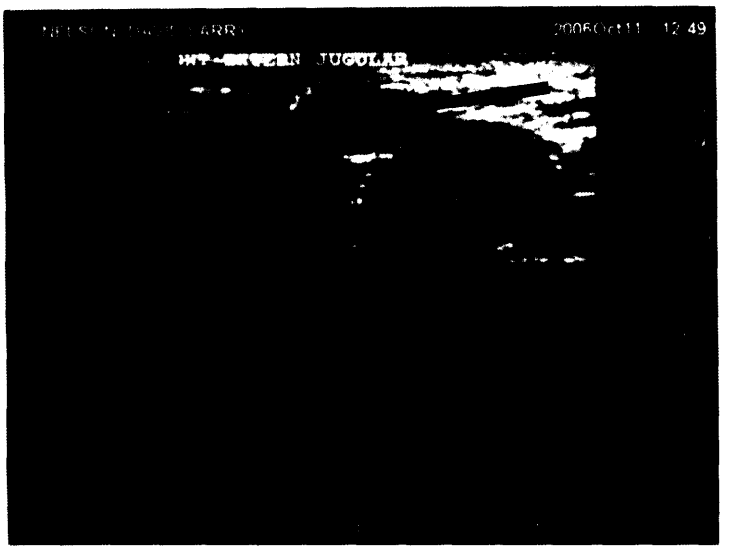


Photo H

Once again, the thin dark arrow points to the external jugular vein. The upper yellow line is where the ultrasound probe was placed to examine the external jugular vein, and the heavier lower yellow line indicates probe placement for examination of the right internal jugular vein. The large double black arrow points to the sternocleidomastoid muscle (see below).

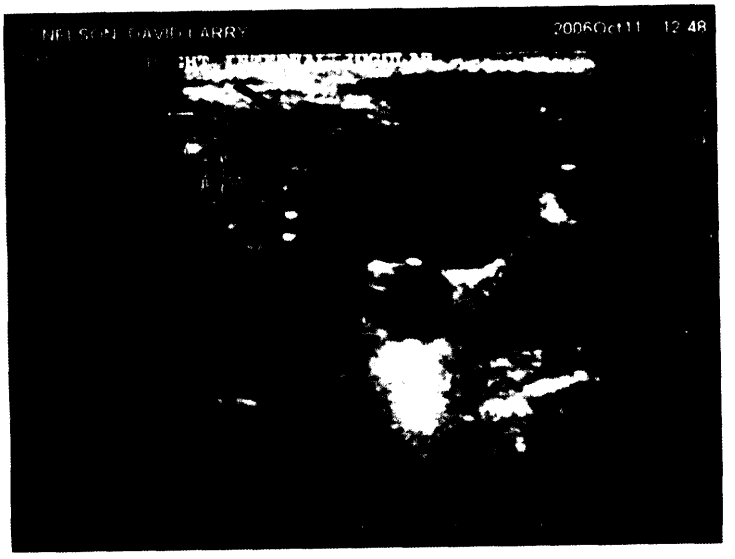
This vein (the external jugular) is easy to see, and yet moderately difficult to cannulate unless the operator has had some experience in cannulating it specifically, as it is very easy to go through the vein instead of into it. Mostly one finds MDs and military combat medics accessing this vein, but some EMT/paramedics may have had experience with it. Nurses usually do not use veins in the neck.



Ultrasound 5

The dark arrow points to the right external jugular vein.

The largest vein in the neck is the internal jugular. It courses through the neck deep to the sternocleidomastoid muscle (indicated by the large black double arrow in Photo H; see Glossary) and generally shallow and lateral to the carotid artery. See Ultrasound 6. The single arrow points to the right internal jugular vein, and the double arrow to the right carotid artery.



Ultrasound 6

The internal jugular vein is generally restricted to access by physicians, some advanced nurse practitioners (such as CRNAs) and perhaps some PAs (physicians' assistants) who have had specialized training in central venous

line placement (see Glossary). Once one has performed some 40-50 of these procedures they become quite straightforward. This vein is generally used for major resuscitative infusions (large volume, rapid administration), for monitoring of central venous pressure, or as an access for pacemaker wires or Swann-Ganz catheters commonly used during heart surgery. The catheters needed to access this vein are of necessity longer and larger in diameter than most peripheral intravenous catheters. Because of the size of catheter usually placed, a local anesthetic is commonly injected at the insertion site. Entering the central venous circulation is inherently more dangerous than peripheral vein cannulation, as the surrounding structures are more vital and less accessible if damaged (carotid artery, lungs, thoracic duct, etc). Mr. Nelson's internal jugular veins are large and (with the above limitations in mind) would not be terribly challenging to cannulate.

The last part of the exam involved the left internal and external jugular veins. See Photo I, and Ultrasounds 7 and 8.

Photo I

The dark arrow points to the left external jugular vein. The thin yellow line is the site of the ultrasound probe for the external jugular examination, and the heavier yellow line that for the internal jugular. The same constraints and considerations as mentioned above apply for this side as well.

Ultrasound 7

The arrow points to the left external jugular vein.

Ultrasound 8

The upper arrow points to the left internal jugular vein, and the lower double arrow to the left carotid artery.

It is not generally possible to image the subclavian veins with ultrasound, and this was not attempted.

In summary, Mr. Nelson has readily accessible peripheral veins in the following regions. They are listed in order of ease of access and therefore preference.

1. Right basilic vein in right antecubital fossa (a peripheral vein; see Glossary). This vein is easily cannulated by most persons with basic intravenous skills (i.e. emergency medical technicians/paramedics who are so certified, military combat medics, nurses, CRNAs (certified registered nurse anesthetists), PAs (physician's assistants) and physicians).
2. Right saphenous vein at the right medial malleolus (a peripheral vein). This vein is easily cannulated by most persons with basic intravenous skills.
3. Left saphenous vein at the left medial malleolus (a peripheral vein). This vein is easily cannulated by most persons with basic intravenous skills.
4. Right external jugular vein, just posterior to the midpoint of the sternocleidomastoid muscle (a peripheral vein). Cannulating this vein is a little harder, and requires a bit more experience.
5. Left external jugular vein, just posterior to the midpoint of the sternocleidomastoid muscle (a peripheral vein). Same as for right external jugular.

In addition to the peripheral veins listed above, the internal jugular veins (central veins) are also accessible, but gaining such access requires an advanced-level practitioner (CRNA, MD, PA). However, given the accessibility of the peripheral veins listed above, it is my medical opinion that cannulation of central veins will not be necessary to obtain venous access on David Larry Nelson.

GLOSSARY

(listed in order of text appearance)

IV of sufficient size: intravenous catheters are sized in gauges, with larger numbers representing smaller diameters. Although the Warden did not know the size IV generally placed for lethal injection, I would suspect that it would be 18ga (ideal in terms of ability to inject the volume required in the time allotted, as well as not being as uncomfortable as a larger 16 or 14ga catheter) or possibly a 20ga (not as much flow). Anything smaller would be essentially worthless.

Palmar and Volar: the palmar surface of the arm is that which is contiguous with the palm of the hand; the volar surface represents the back of the hand.

Most experienced IV personnel like to use the volar surface of the hand or forearm.

Antecubital Fossa: that part of the arm at the elbow where, with the palm up, the skin creases when the elbow is bent.

Ultrasonic examination: carried out using a state of the art Sonosite MicroMaxx ultrasound machine equipped with a linear vascular probe. It is becoming standard of care to use this device when performing central venous access, as it increases the level of safety considerably. This device emits sound waves into the tissues and then constructs a cross sectional image based upon the sound as it is reflected back. In the images in this document the surface of the skin is at the top of each image. On the right margin there is a depth scale which allows one to know the exact depth and size of a given structure. Typically, veins are seen in cross section as dark circles while the surrounding tissues are lighter.

Venous Stasis: poor circulation of the blood as it is returned to the heart from the legs. This is usually manifested by varicose veins, which are segmental enlargements of the veins in the leg caused by failure of the venous valve system, due to the increase of hydrostatic (fluid) pressure in the leg when a person is upright. This fluid pressure amounts to a sizeable figure, commonly 180 cm of water, or about one-half atmosphere pressure. This considerable load is dealt with via the pumping action of the leg muscles coupled with valves that do not permit reverse flow. Varicosities are most commonly hereditary, and may cause pain and localized swelling. In later stages of the disease, fluid leaks out of the vessels and ulcers form as the skin breaks down. Mr. Nelson has the varicose veins (varicosities) and early skin changes.

Varicosities: varicose veins. See above **Venous Stasis**.

Cannulation: refers to the act of inserting a plastic catheter into a vein or other structure. Also commonly referred to as "starting an IV." The technique requires locating the vein, usually by placing a tourniquet on the extremity between the heart and the desired site of placement and locating the vein by visual and palpatory methods. A catheter-over-needle device is then inserted into the vein through the skin; when blood returns through the needle the catheter is slid into the vein over the needle. The needle is then removed, leaving a plastic flexible pathway into the vein (also known as percutaneous placement). Neck veins (internal and external jugular) and subclavian veins do not allow the use of tourniquets; the patient is usually supine, in a head-down position on a stretcher to allow gravity to assist in blood pooling and dilation of the these veins.

Lumen: the space inside the vein where blood is carried.

Anterior cervical triangle: an area in the neck bordered by the sternal and clavicular heads of the sternocleidomastoid muscle, and the upper border of the clavicle. This is readily demonstrated by turning the head to one side and then attempting to turn it the other way while holding the chin and resisting the movement.

Sternocleidomastoid muscle: The prominent strap muscle of the neck which attaches to the mastoid process (the bump on the skull immediately behind the ear) and to both the top of the sternum (breastbone) and the clavicle (collarbone) approximately an inch lateral to the sternal insertion.

Central venous access: in this document is the same as ***percutaneous*** (literally means through the skin) central venous access, and refers to the act of inserting a catheter-over-needle device into a central vein (see below). This may be achieved in three commonly used places: the internal jugular vein, the femoral vein, or the subclavian vein. The subclavian route has the greatest associated discomfort and risk, that being pneumothorax or puncturing of the lung. The femoral route is questionably the most difficult, as it is buried deep in the groin and its landmarks are not as reliable. The internal jugular is probably the easiest, as it is usually not more than a centimeter or two deep, with fairly reliable landmarks. Its main complication is cannulation of the carotid artery.

A note about "peripheral" and "central" veins is in order at this point. A ***peripheral*** vein is one in the extremities or neck which is separated from the great veins (inferior or superior vena cavae) leading to the heart by two or more divisions. Peripheral veins are frequently visually identified or palpable. In this particular instance, the external jugular would be considered a peripheral vein, since it is easily visualized, palpable, and empties into the subclavian veins on each side, which then empty into the superior vena cava via a short trunk named the brachiocephalic vein. The vena cava leads directly to the heart.

A ***central*** vein leads (via no more than one other named structure, usually a short trunk) to the vena cava (either inferior or superior), which then empties directly into the heart (right atrium).